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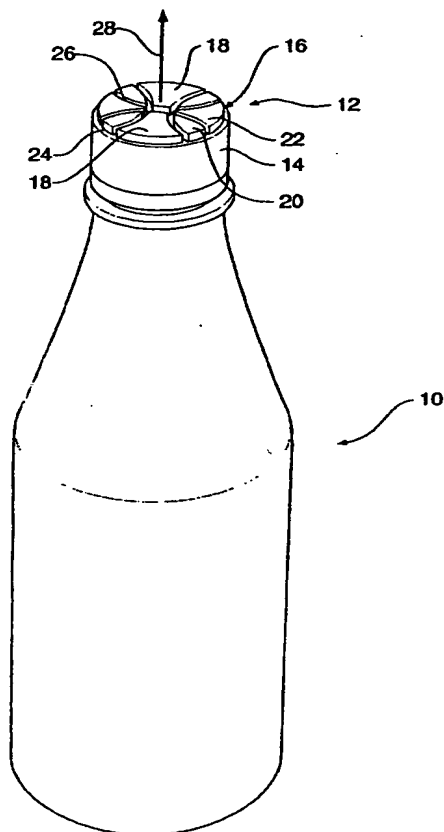
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[Continued on next page]

(54) Title: BOTTLE CAP BUILDING BLOCK



(57) Abstract: A bottle cap (12) for use with a bottle (10) and that may also be used as a toy. The cap (12) includes an upper surface (16) and a peripheral skirt (14) extending downwardly from said upper surface to define a bore adapted to extend over a neck of the bottle. Located on the upper surface (16) are a number of projections (18, 20, 22) that are of a shape and size to define at least one pathway or groove (26) extending across at least a part of said upper surface. The width of the pathway (26) is chosen to be the same or slightly smaller than the width of the skirt. This enables the skirt (14) of one cap to engage the pathway of another cap in a mating arrangement enabling the caps to be used as building blocks. Generally there are a number of projections defining a number of different pathways so that the skirt of one cap may simultaneously engage several other caps.

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### Bottle cap building block

The present invention relates to bottle or container sealing caps and in particular to a cap which is also a building block or a toy. The cap is of a shape and size enabling two or more caps to be joined together in a building block arrangement so as to form multiple variations of objects.

### BACKGROUND OF THE INVENTION

Bottle or container caps or tops that function both as a cap and as a toy are known whereby a bottle cap can also be used as a toy. Further, bottle caps that can be used with other bottle caps to form a multiplicity of objects are also known. However, these bottle tops are quite complex in design, depend exclusively on interference fits to keep the bottle tops in a stacked arrangement and are complex and expensive to make.

It is therefore an object of the present invention to provide a bottle or closure cap or seal which also functions as a building block that overcomes at least some of the abovementioned problems or provides the public with a useful alternative.

### 15 SUMMARY OF THE INVENTION

Therefore in one aspect of the invention though this need not be the only or indeed the broadest form there is proposed a bottle cap for use with a bottle including;

- an upper surface;
- a peripheral skirt extending downwardly from said upper surface and defining a bore adapted to extend over a neck of the bottle;
- a plurality of projections extending upwardly from said upper surface said projections being of a shape and size to define at least one pathway extending across at least a part of said upper surface;
- wherein the pathway width and shape is correspondingly shaped to at least a part of the width and shape of the skirt enabling at least said part of the skirt of a second cap to engage said pathway in a mating arrangement.

Preferably said mating is an interference fit arrangement. This is achieved by making the pathway at least slightly smaller in width than the skirt but not too small so that under a bit of force the skirt can engage the pathway.

Advantageously said skirt is of a cylindrical construction. However, the skirt may be of a polygonal shape having a plurality of sides. Provided that there are equally shaped pathway on the upper surface of another cap, the cap may still be used as a building block.

Preferably said projections include sides having a curvature equal to the curvature of the skirt.

- 5 This ensures that there is maximum contact between the skirt of one cap and the projection of another. However, in some instances, it may be that provided there is a clear pathway, the sides of the projections may not always be in total contact with the skirt.

Preferably at least some of the projections are circumferentially and symmetrically disposed around a longitudinal axis of said cap.

- 10 Advantageously the skirt is internally threaded so as to engage threads on the bottle. Alternatively, the cap may be of a snap fit type that is used as a closure cap on some other bottles.

- 15 Preferably said cap includes a central projection having a pre-determined number of sides and wherein there are further outer projections whose number equals the total number of sides of the central projection, said outer projections disposed symmetrically and circumferentially around said central projection so that the centre of each said outer projection is generally aligned with the mid-point of one of the sides of said central projection.

- 20 Preferably there is a second set of outer projections whose number is equal to the total number of sides of the central projection, said outer projections positioned so that they are aligned radially with the apex of the sides of the central projection.

Advantageously there are pluralities of different sets of projections, each set positioned diagonally across the centre of said cap.

Other objects and advantages will become apparent when taken into consideration with the following drawings and specifications.

- 25 Preferably, said skirt may have different widths in different parts.

## BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several implementations of the invention and, together with the description, serve to explain the advantages and principles of the invention. In the drawings,

- 5           Figure 1       is a perspective view of a bottle with a bottle cap according to a first embodiment of the present invention;
- Figure 2       is a top view of a the bottle cap of Figure 1;
- Figure 3       is a perspective view of the bottle cap of Figure 1;
- 10           Figure 4       is a top view of a the bottle cap of Figure 1 illustrating its relative position when mounted on two other bottle caps;
- Figure 5       is a perspective view of the arrangement of Figure 4;
- Figure 6       is a top view of an alternative design of a bottle cap embodying the present invention;
- Figure 7       is a perspective view of the bottle cap of Figure 6;
- 15           Figure 8       is a top view of the bottle cap of Figure 6 when stacked on three other bottle caps;
- Figure 9       is a perspective view of the bottle caps of Figure 8;
- Figure 10       is a perspective view of a stacked arrangement of a further design of a bottle cap embodying the present invention;
- 20           Figure 11       is a top view of the bottle cap of Figure 10;
- Figure 12       is a perspective view of the bottle cap of Figure 10;
- Figure 13       is a top view of the bottle cap of Figure 10 when partially stacked on two other bottle caps; and

Figure 14 is a perspective view of the bottle cap arrangement of Figure 13.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following detailed description of the invention refers to the accompanying drawings.

Although the description includes exemplary embodiments, other embodiments are possible,

5 and changes may be made to the embodiments described without departing from the spirit and scope of the invention. Wherever possible, the same reference numbers will be used throughout the drawings and the following description to refer to the same and like parts.

It is also to be understood that although the following description refers to the use of caps on bottle, they may equally well be used for the closure of other devices such as containers and  
10 pipes.

Figure 1 depicts a bottle 10 having a bottle cap 12 of a generally cylindrical shape including an outer sleeve or skirt 14 defining a bore and an upper surface 16. The skirt includes internal threads (not shown) that enable the cap to be screwed onto an external thread that is typically found on the neck of bottle 10. Such caps are well known and include other features that will  
15 not be discussed here and that assist in sealing the bottle.

The skirt is generally circumferential and extends downwardly from the upper surface 16 so as to fit over the neck of the bottle. Disposed on the upper surface 16 and extending generally upwardly are different size projections 18, 20 and 22. The projections are located adjacent the skirt 14 to thereby define an outer lip or thickness of skirt 24 and are separated by grooves or  
20 channels 26 whose overall separation wholly or in part is generally the same or slightly smaller than the thickness 24 of the skirt.

The projections are so designed that a continuous groove is formed in an arc across the cap. Being of the same width as the skirt the skilled addressee will appreciate enables one cap to engage wholly or partially another. Thus the projections need not be the same size and height  
25 and may further be of a non-planar shape.

There are a plurality of projections 18, 20 and 22 distributed symmetrically circumferentially around the longitudinal axis 28 of the bottle cap so that diagonal projections are of the same shape. For example as illustrated in Figures 2 and 3 diagonal projections 30 and 32 are of the same shape and size as are diagonal projections 34 and 36, projections 38 and 40 and  
30 projections 42 and 44.

Since the projections are adjacent the skirt, the skirt of one cap engages over the top of another cap. It will be appreciated by a person skilled in the art that to enable a cap to engage partially another cap, the shape and size of the projections is designed so that a path across a cap defined by several grooves has the same shape generally as the curvature of skirt.

- 5 Thus, as illustrated in Figure 2, which is a first embodiment of a cap, channel 42 is of a curvature equalling that of the skirt and is defined by the adjacent projections 36 and 40 and adjacent projections 38 and 42.

- The person skilled in the art will appreciate that a bottle cap as illustrated in Figures 2-5 present a total of five positions that a cap can engage another cap, four of these being partial engagements and one being simply a cap fitting fully on top of another cap.

Once it is understood that a bottle cap so constructed may provide for a plurality of grooves or paths whose curvature is the same as that of the skirt, many different embodiments may be constructed.

- 15 A further design embodying the present invention is illustrated in Figures 6-9. This design provides for there to be three identical projections 48 symmetrically disposed circumferentially around the bottle cap, a central projection 50 and three outer projections 52. The embodiment thus illustrated provides for another cap to engage the cap illustrated in four different positions.

- The minor projections 52 are not essential to the operation of the caps. They may however assist in providing stability and increasing the friction hold between stacked arrangements.

The inclusion of a central projection enables more than one cap to engage a further three caps and compared with the embodiment illustrated in Figures 2-5 where one cap could engage only another two caps.

- 25 One skilled in the art can appreciate that increasing the individual number of projections increases the number of channels or grooves that can accommodate the skirt of another bottle cap. Symmetrical positioning of the projections leads to a configuration of more grooves of appropriate curvature for engagement with the skirt, or part of the skirt of another bottle cap.

- 30 Illustrated in Figures 10-14 is yet another design of a bottle cap embodying the present invention. The cap includes eight major projections 54 and eight minor projections 56

disposed symmetrically circumferentially around the axis of the cap 12 defining a total of nine different paths that can accommodate the skirt of another bottle cap.

The total number, shape and height of projections may be chosen depending on the ease of manufacture of the bottle cap as well as the material from which they are to be made. For example, the plurality of minor projections circumferentially disposed adjacent the skirt assist in anchoring one cap onto another. However, these would not be preferred if the cap was made from fragile material which would allow the projections to be easily broken or bent.

It will also be appreciated by one skilled in the art that the caps of the present invention may be made using different manufacturing techniques. For example, the caps may be die cast, may be produced by a layering technique or may even be producing by cutting out of suitable material.

Thus one can appreciate the novelty of the present invention being for a combination toy and bottle cap.

Further advantages and improvements may very well be made to the present invention without deviating from its scope. For example, the projections may not be symmetrically and circumferentially disposed around the longitudinal axis of the cap. This would limit the construction of any object but at times it may be desirable to have only a few possible mating combinations between different caps and it may also be desirable that these not be symmetrical. Other variations may include a bottle cap construction whose surface is not circular but say square. The skirt would then be also of a square cross-sectional shape and the grooves would be correspondingly shaped to enable mating of the skirt to the grooves. Other shapes may equally well be used.

A further embodiment, although not shown, may include at least two different groove sizes which are therefore adapted to make the skirts of different sizes. This would then allow objects to be constructed with different size bottle caps.

Although the invention has been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope and spirit of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.



In the claims that follow and in the summary of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprising" is used in the sense of "Including", i.e. the features specified may be associated with further features in various embodiments of the invention.

## CLAIMS

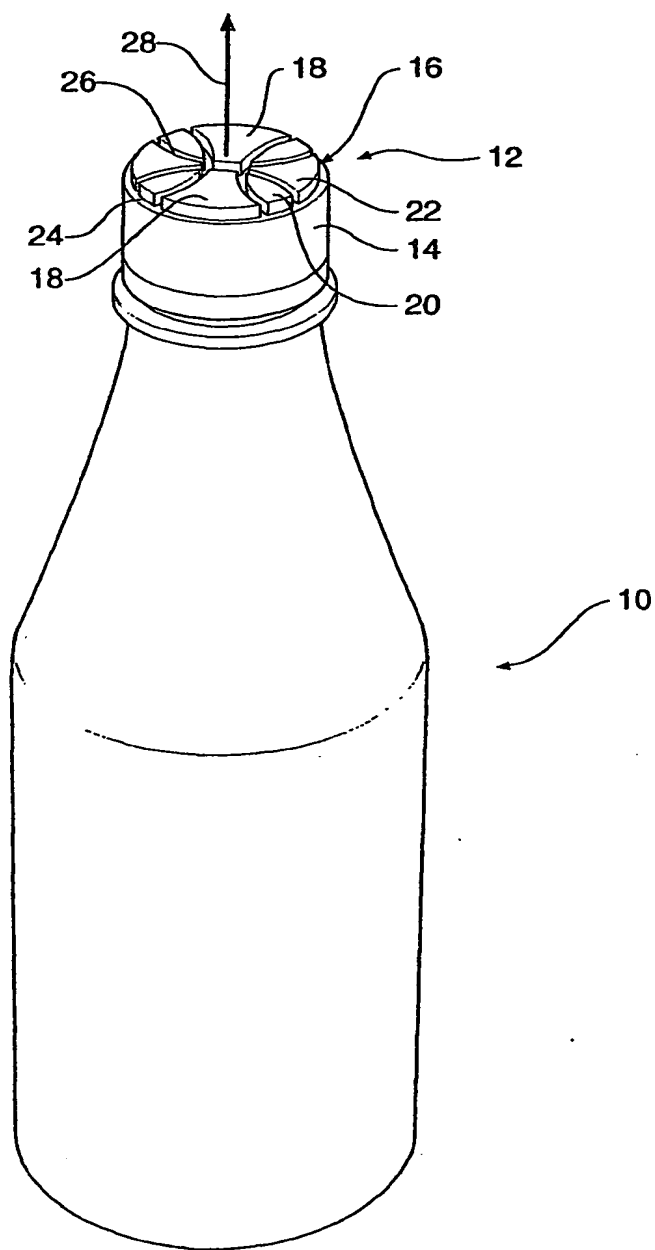
1. A bottle cap for use with a bottle including;  
an upper surface;  
a peripheral skirt extending downwardly from said upper surface and defining a bore  
5 adapted to extend over a neck of the bottle;  
a plurality of projections extending upwardly from said upper surface said projections  
being of a shape and size to define at least one pathway extending across at least a  
part of said upper surface;  
wherein the pathway width and shape is correspondingly shaped to at least a part of  
10 the width and shape of the skirt enabling at least said part of the skirt of a second cap  
to engage said pathway in a mating arrangement.
2. A bottle cap as in claim 1 wherein said mating is an interference fit arrangement.
3. A bottle cap as in any one of the above claims wherein said skirt is of a cylindrical  
construction.
- 15 4. A bottle cap as in any one of the above claims wherein said projections include sides  
having a curvature equal to the curvature of the skirt.
5. A bottle cap as in any one of the above claims wherein at least some of the projections  
are circumferentially and symmetrically disposed around a longitudinal axis of said  
cap.
- 20 6. A bottle cap as in any one of the above claims wherein the skirt is internally threaded  
so as to engage threads on the bottle.
7. A bottle cap as in any one of claims 1 to 5 wherein the skirt includes an inner annular  
lip adapted to provide for a snap-fit type arrangement over a bottle.
- 25 8. A bottle cap as in any one of the above claims wherein said cap includes a central  
projection having a pre-determined number of sides and wherein there are further  
outer projections whose number equals the total number of sides of the central  
projection, said outer projections disposed symmetrically and circumferentially around  
said central projection so that the centre of each said outer projection is generally  
aligned with the mid-point of one of the sides of said central projection.

9. A bottle cap as in claim 8 wherein there is a second set of outer projections whose number is equal to the total number of sides of the central projection, said outer projections positioned so that they are aligned radially with the apex of the sides of the central projection.
10. A bottle cap as in any one of claims 1 to 7 wherein there are pluralities of different sets of projections, each set positioned diagonally across the centre of said cap.

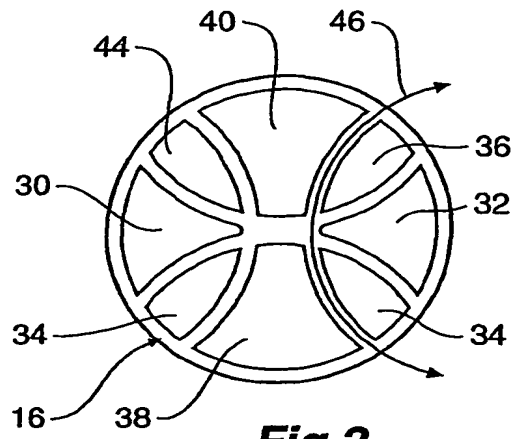
Dated this 17th day of July 2001

Joe Ciacciarelli and Christopher Grech  
By their Patent Attorneys  
LESICAR PERRIN

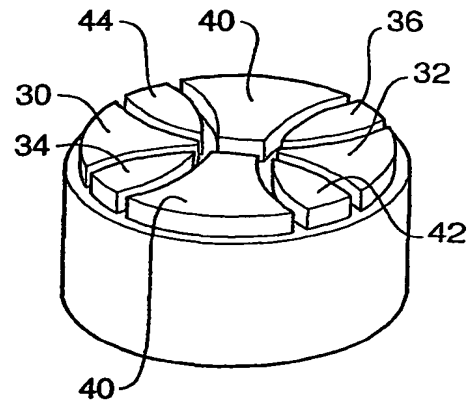
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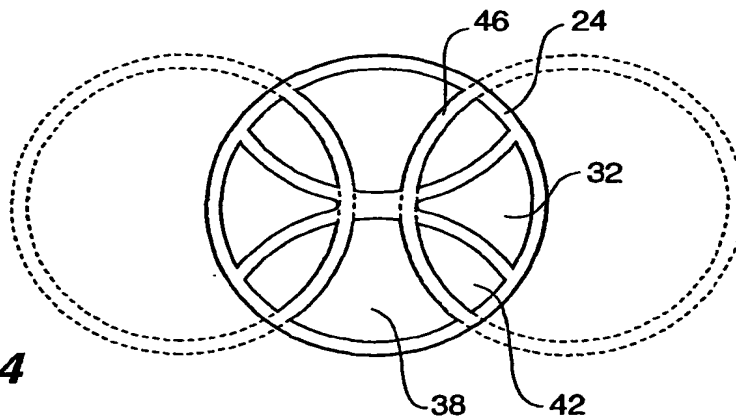
**Fig 1**



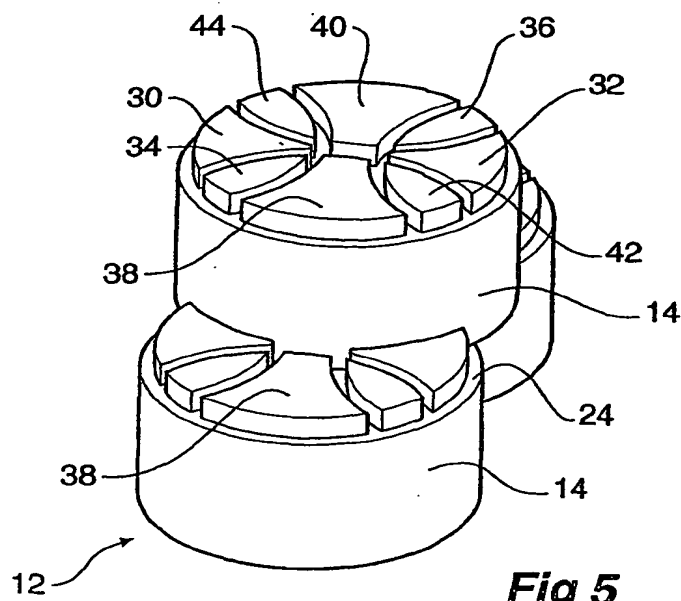
**Fig 2**



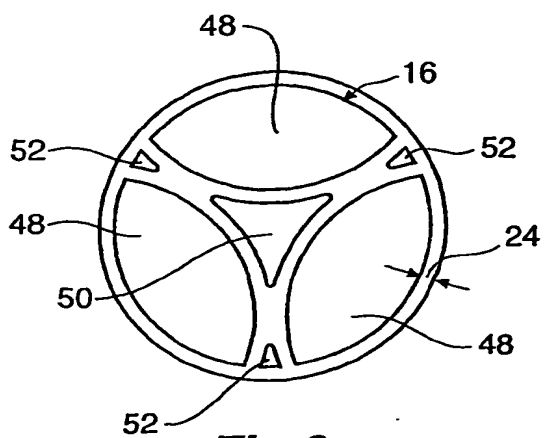
**Fig 3**



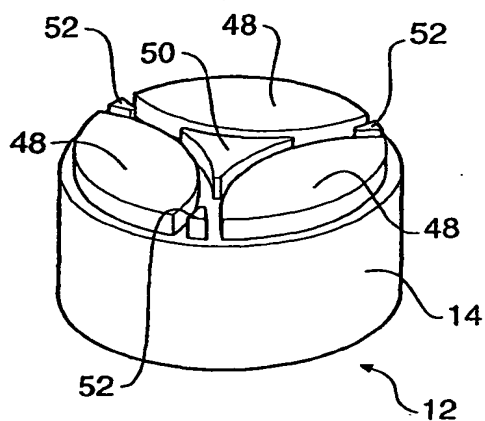
**Fig 4**



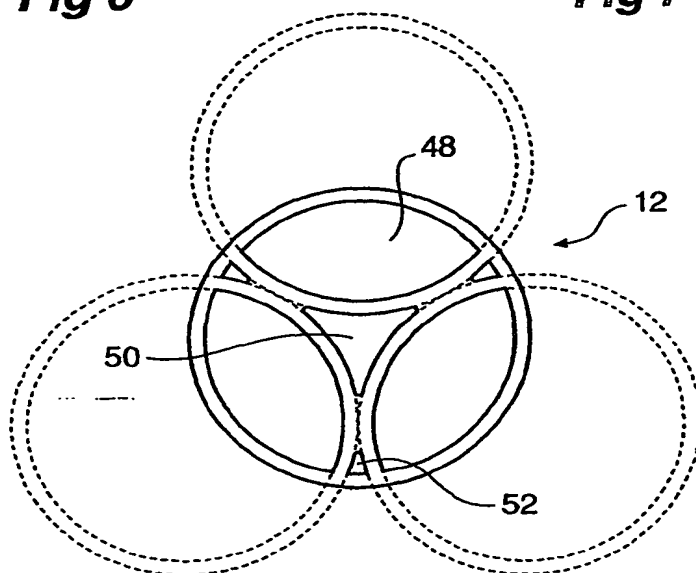
**Fig 5**



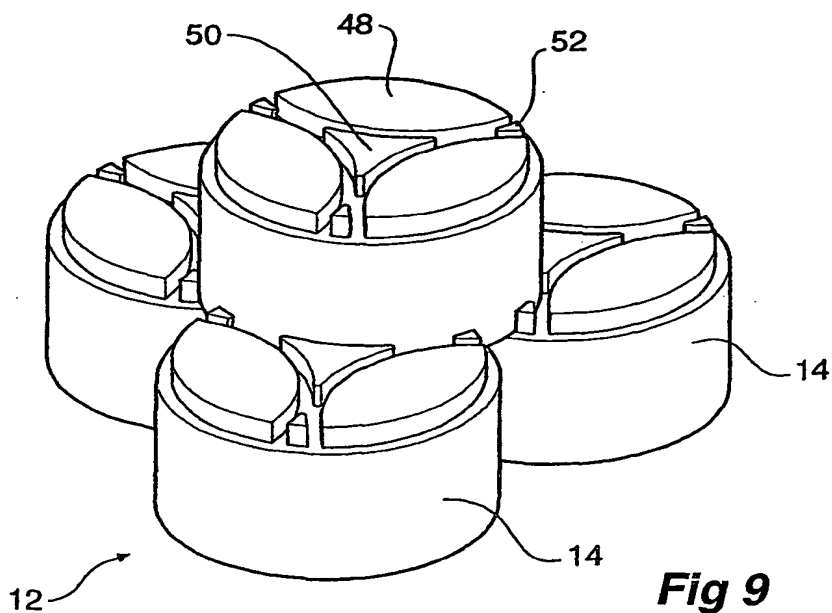
**Fig 6**



**Fig 7**

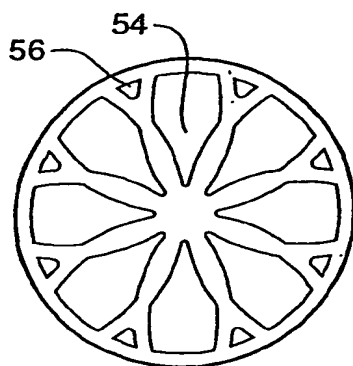


**Fig 8**

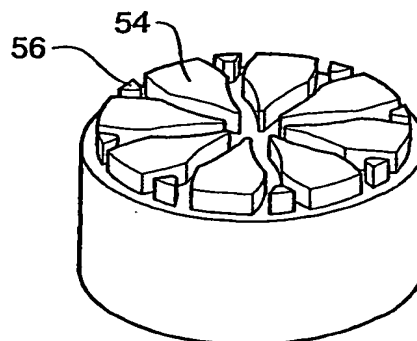


**Fig 9**

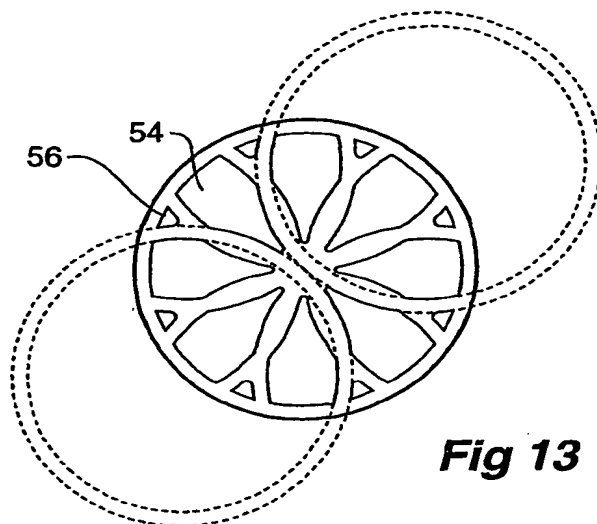
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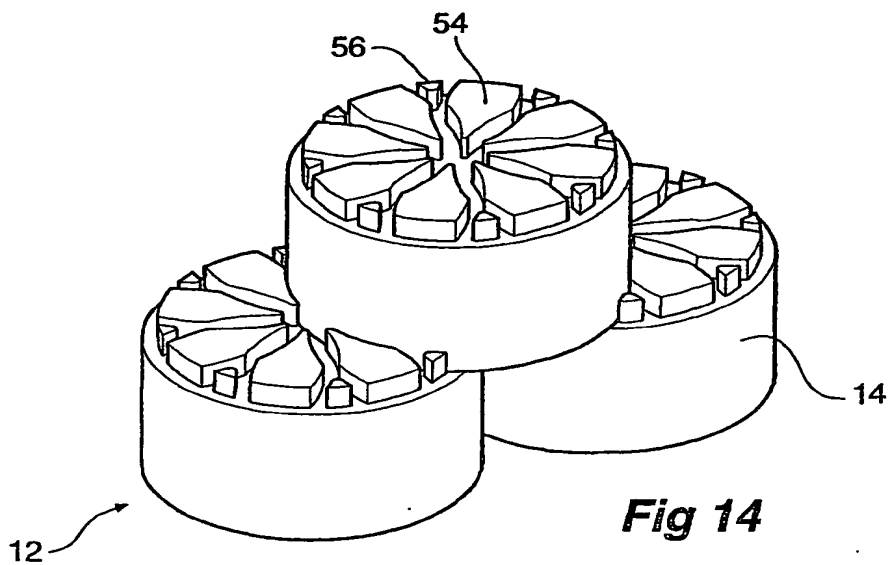
**Fig 11**



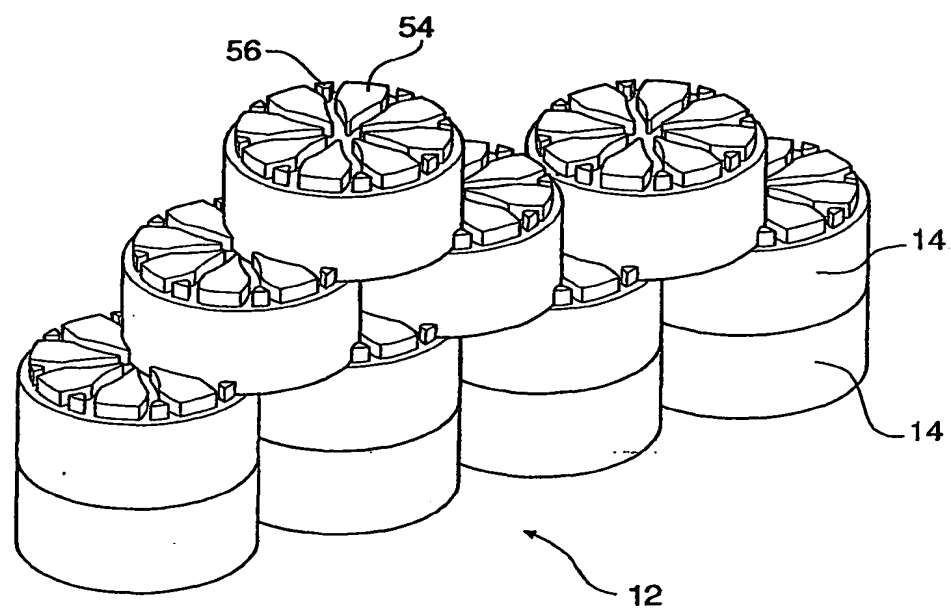
**Fig 12**



**Fig 13**



**Fig 14**



**Fig 10**



## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU01/00868****A. CLASSIFICATION OF SUBJECT MATTER**Int. Cl. <sup>7</sup>: A63H 33/04, 33/08, B65D 41/04, 51/24

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

REFER ELECTRONIC DATA BASE CONSULTED BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AU: IPC A63H 33/04, 33/06, 33/08

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI IPC A63H 33/00, 33/04, 33/06, 33/08, B65D 41/-, 43/-, 51/- &amp; keywords: CAP, PROJECTIONS, PATHWAY, ENGAGE, MATE, ASSEMBLE, SKIRT and similar terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 00/55063 A (SHNAIDER) 21 September 2000 See whole document	1-10
X	CH 642321 A5 (VOLKER KUNZLI) 13 April 1984 See whole document - Figure 2	1-7, 10
A	US 5361919 A (HULL) 8 November 1994 See whole document	1-10

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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9 OCTOBER 2001

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU01/00868**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
WO	200055063	AU	200035780
CH	642321	NONE	
US	5361919	NONE	
END OF ANNEX			